MYCOTAXON

ISSN (print) 0093-4666 (online) 2154-8889 Mycotaxon, Ltd. ©2020

April–June 2020—Volume 135, pp. 275–280

https://doi.org/10.5248/135.275

Aecidium peristrophes, a new record for Pakistan

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Abstract—During a survey of plant pathogenic fungi of Khanspur, Thandiani, and adjacent areas, two plant species—*Hedera helix* (*Araliaceae*) and *Peristrophe* sp. (*Acanthaceae*)—were found to be infected with rust fungi. After careful morphological and anatomical observations, these rusts were identified as *Aecidium hederae* and *A. peristrophes,* with *A. peristrophes* reported as a new record for Pakistan.

Key words—Abbottabad district, aeciospores, *Pucciniales*

Introduction

Aecidium Pers. is an asexual genus of rust fungi that possesses non-repeating spores. Following dikaryotization of spermogonia, aeciospores are produced. Catenulate spores are the characteristic feature of this genus. These spores are surrounded by special structures called peridia (Cummins & Hiratsuka 2003). Although the asexual morph generic name is now considered a synonym of *Puccinia* and no longer recognized (Aime & al. 2018), a number of species previously described in this genus have not been placed in valid genera and thus must continue to be recognized in *Aecidium*. Seventeen species of this asexual morph genus are reported from Pakistan (Ahmad & al. 1997; Ishaq & al. 2018). During the 2016–18 surveys of pathogenic fungi, we collected plants of *Hedera helix* and *Peristrophe* infected with rust fungi. Based on their morphology these rusts were identified as *Aecidium hederae* and *A. peristrophes*.

Materials & methods

Plants infected with rust fungi were collected from Khanspur and Thandiani forest, Khyber Pakhtunkhwa province, Pakistan. Healthy plants along with fruits

Plate 1: *Aecidium peristrophes,* A. Infected host plant, *Peristrophe* sp., B. Infection under stereomicroscope, C. Aeciospores, D. Peridial cells. Scale bars: A = 5 mm, B = 1 mm, C, D = 10 µm.

and inflorescence were also collected for identification. Host plants were identified by comparing with plants in the herbarium of Department of Botany, University of the Punjab, Lahore (LAH).

Scratch mounts and free hand sections of infected portions were made in lactophenol. Partial permanent slides were made by cementing glass cover slips with nail lacquer and slides were examined under a biological microscope (LABOMED,

Labo America, Inc. USA). Line drawings of different spore stages were made using a Camera Lucida (Ernst Leitz, Wetzlar, Germany). Dimensions of spores were taken using Scope Image 9.0(5X) with 40X objective. Forty spores were measured for each species.

Taxonomy

Aecidium peristrophes Syd. & P. Syd., Ann. Mycol. 10(3): 272 (1912) Pls 1–2

Spermogonia, uredinia, and telia not found. Aecia epiphyllous, loosely arranged, yellowish brown, irregular. Aeciospores ovoid to angular, hyaline to subhyaline, 1–3 germ pores per cell, 16–23 × 20–24 µm; peridial cells hyaline to subhyaline, angular to hexagonal-pentagonal, 17–30 × 19–28 µm, wall verrucose, 2–5 µm thick.

Material examined: **PAKISTAN**, **Khyber Pakhtunkhwa**, **Abbottabad District**, Thandiani, at 2750 m asl, on *Peristrophe* sp. (*Acanthaceae*), 14 August 2018, N.S. Afshan, NSA#01 (LAH1408).

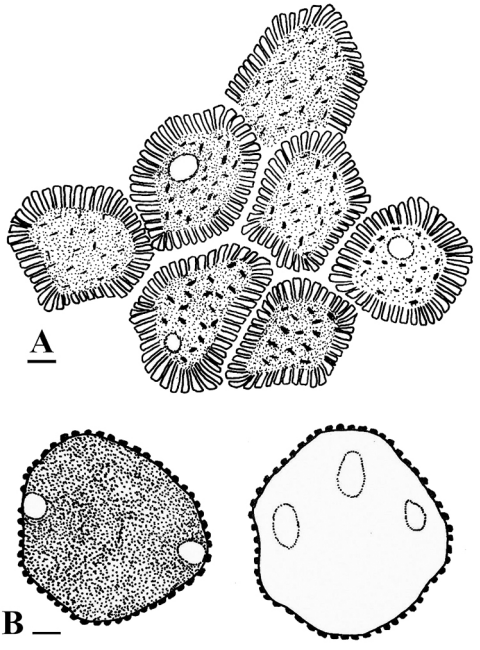

Plate 2: Line drawings of *Aecidium peristrophes,*
A. Peridial cells, B. Aeciospores. Scale bars: A, B = 5 µm. (Drawings by Maria Riaz)

Comments—*Aecidium peristrophes* was collected on *Peristrophe* sp. and represents a new record for Pakistan. It was previously reported on the same

host genus from China and India (Sydow & al. 1912, Laundon 1963, Zhuang 2001). *Puccinia peristrophes* Petr. was also reported on the same host plant from Malaysia (Petrak 1954), but aeciospores were not cited in the description. *Peristrophe* sp. is also reported here as a new host for rust fungi in Pakistan.

Aecidium hederae Wakef., Bull. Misc. Inf., Kew 1931: 202 (1931) Pls 3–4

Spermogonia, uredinia and telia absent. Aecia amphigenous, cup-shaped, pale yellow to yellowish orange spots, mostly grouped, sometimes scattered, 1–3 × 1–1.5 mm. Aeciospores pale yellow to honey colored with yellowish orange granules, subglobose or ovoid–obovoid, 11–16 × 15–23 µm; wall hyaline, verrucose, 1–3 µm thick; peridial cells angular to subangular or rhomboidal, hyaline to pale yellow, 11–19 × 15–26 µm, wall verrucose to striolate verrucose, 2–4 µm thick; germ pores obscure.

Material examined: **PAKISTAN**, **Khyber Pakhtunkhwa**, **Abbottabad District**, Khanspur, at 2250 m asl, on *Hedera helix* L. (*Araliaceae*), 3 May 2017, Najam ul Sehar Afshan NSA#02 (LAH1409); June 2018, N.S. Afshan, A.N. Khalid, NRPU#02 (LAH14096).

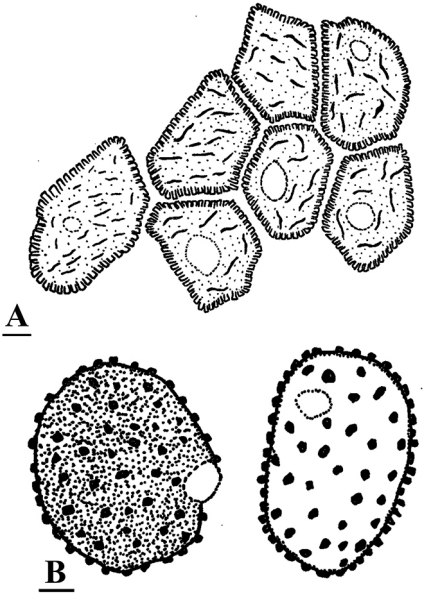

Plate 3: Line drawings of *Aecidium hederae,*
A. Peridial cells, B. Aeciospores. Scale bars: A, B = 5 µm. (Drawings by Maria Riaz)

Comments—*Aecidium hederae* has previously been reported from Pakistan on *Hedera helix* and *H. nepalensis* K. Koch from Murree and on *H. helix*

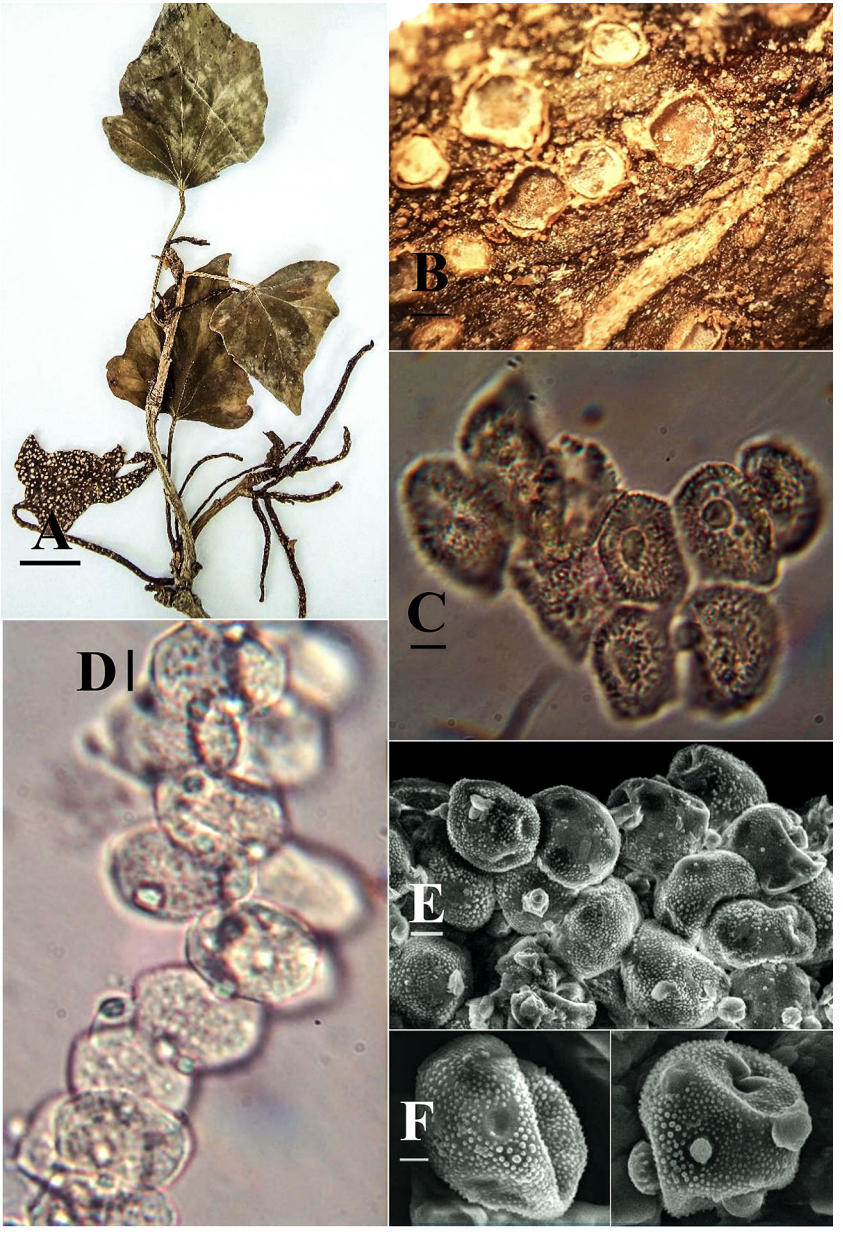

Plate 4: *Aecidium hederae,* A. Infected host plant, *Hedera helix;* B. Detail of infection; C. Peridial cells; D. Aeciospores; E. SEM photograph of peridial cells; F. SEM photograph of aeciospores. Scale bars: A = 2 cm, B = 5 mm, C, D = 10 µm, E, F = 5 µm.

from Malkandi, Kaghan (Wakefield 1931, Ahmad 1956, Iqbal & Khalid 1996, Ahmad & al. 1997). The rust has also been reported on *Hedera himalaica* Tobler [= *H. nepalensis*] and *H. helix* from India (Farr & Rossman 2018). This is a new record for Khanspur, Pakistan.

Acknowledgments

We thank Prof. Dr. Abdul Nasir Khalid (Department of Botany, University of the Punjab, Lahore, Pakistan) for his help in field work. The authors also wish to thank Dr. Amy Y. Rossman (Oregon State University, Corvallis, USA) and Dr. Omar Paino Perdomo (Instituto Tecnólogico de Santo Domingo, Dominican Republic) for presubmission reviews of this manuscript. This work was financially supported by Higher Education Commission (HEC), Islamabad, Pakistan for Research Project No. 7531/Punjab/NRPU/R&D/HEC/2017 under the "NRPU Scheme".

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